SECTION 8

TRANSDUCER SERVICING

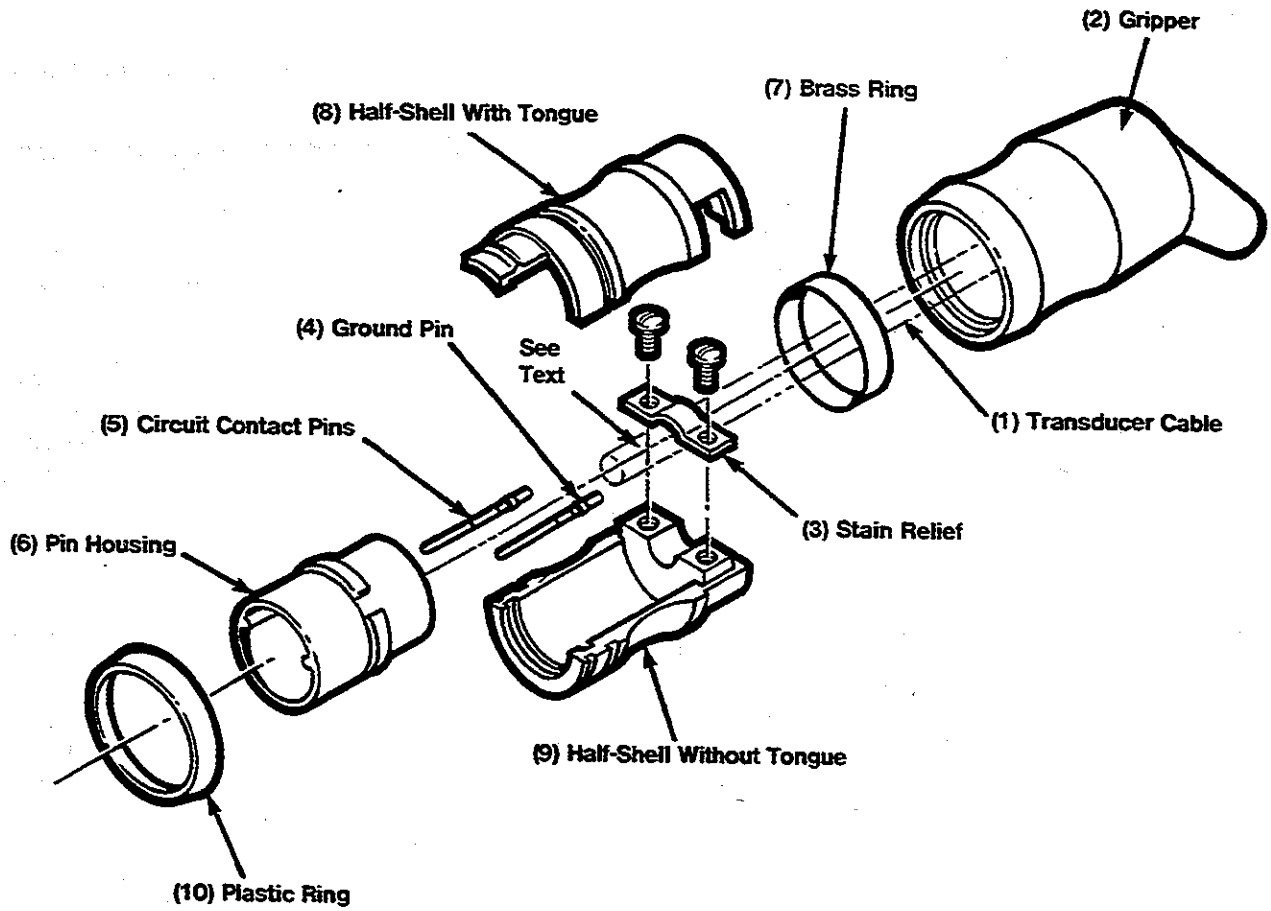
8.0 HANDLING PRECAUTIONS

Transducers are delicate measuring instruments and must be handled accordingly. Transducer damages can be avoided by taking the following precautions:

- Avoid banging or dropping transducers.
- Refrain from wrapping transducer cables around transducer body.
- Do no immerse transducers in aqueous solutions. Follow the Model 115 Fetal Monitor Operator's Manual regarding sterilization of transducers.
- Do not pull on cables when removing transducer plugs from the monitor front-panel connectors; remove plugs by grasping the gripper.

8.1 TRANSDUCER PLUG CONSTRUCTION

Construction details of plugs used on the transducer cable are shown in FIGURE 8-1. A plastic ring (10) slips over the plug's front. To remove the ring, gently insert a screwdriver blade in back of ring and push forward. (This may require inserting the blade at a number of points around the ring.) Once the ring is removed, insert one or more blunt tools (such as a spline-head screwdriver tip) under the lip of the gripper (2). Gently work gripper to the rear by working the tools around the circumference while simultaneously prying upward.



TRANSDUCER PLUG CONSTRUCTION
FIGURE 8-1

NOTE: The gripper adheres tightly to the plug assembly and is normally difficult to remove. Also, the retaining ring (7) is likely to be pulled off in the process. Locate black ring in gripper and remove it with a hooked tool.

The ring and gripper form an outer covering for the plug assembly. This assembly consists of a half-shell with tongue (8), a half-shell with strain relief (9), the cale strain relief (3) which is fastened to the half-shell with two metric screws, and the pin housing (6). This housing contains the shorter circuit contact pins (5) and the longer ground pin (4). These pins are held captive in the housing by fingers which expand when the pins are inserted.

8.2 TRANSDUCER PLUG REPLACEMENT

Replacement plugs can be ordered from the Corometrics Service Department. Before ordering, refer to TABLE 8-1 for appropriate part numbers. Except for the strain gauge, the general method of replacing transducer plugs, depicted in FIGURE 8-1, is done in the following manner:

TRANSDUCER PLUG	PART NUMBER
MECG or LEG PLATE	6158F
US	6158G
PHONO	6158H
TOCO	6158J
STRAIN GAUGE	6158K

TRANSDUCER PLUG PART NUMBERS
TABLE 8-1

1. Transducer cable is routed through the gripper first. Slide gripper, followed by retaining ring, down cable until they are out of the way.
2. Locate grounding pin (the longer pin) in kit. It should be soldered only to wire specified in wire table of corresponding plug.
3. Set aside shorter pins which will be soldered to the remaining wires.
4. After soldering, insert pins in corresponding holes of pin housing. Push in each pin until it bottoms out and is retained by the pin spring fingers, preventing it from backing out of the hole.

NOTE: If a pin is removed from the female sprocket housing, it must be discarded and replaced without exception.

5. Insert pin connector into corresponding recess of the half-shell (with strain relief mounting holes). Position housing so the two dots at the back are visible and at right angles to the plane of the half-shell. Push cable into strain-relief slot. Ensure slot surrounds a portion of the cable with outer covering intact.
6. Fasten strain-relief to half-shell with the two metric screws. The indent of the strain-relief should face inward on the smaller cable (3-5 mm) and outward on the larger cable (5-7 mm).

NOTE: Since the strain-gauge cable has a tube open to atmospheric pressure, care must be exercised to ensure the tube does not lose its patency during installation of the cable strain relief.

7. Place half-shell (with tongue) on pin housing, aligning it with the two dots on back of housing. The half-shells should snap together evenly. Slip retaining ring over them to hold assembly together.
8. Slide gripper up cable and align the two projections at rear of plug assembly with the two recesses at rear of gripper.

NOTE: Do not allow projections and recesses to become misaligned while sliding gripper onto plug or gripper will not seat properly. Position tongue opposite the gripper boot through which the cable extends. This ensures that the cable will extend downward once the plug is inserted into the monitor.

CAUTION: When sliding the gripper over plug assembly, pull cable through boot to prevent any kinking inside gripper.

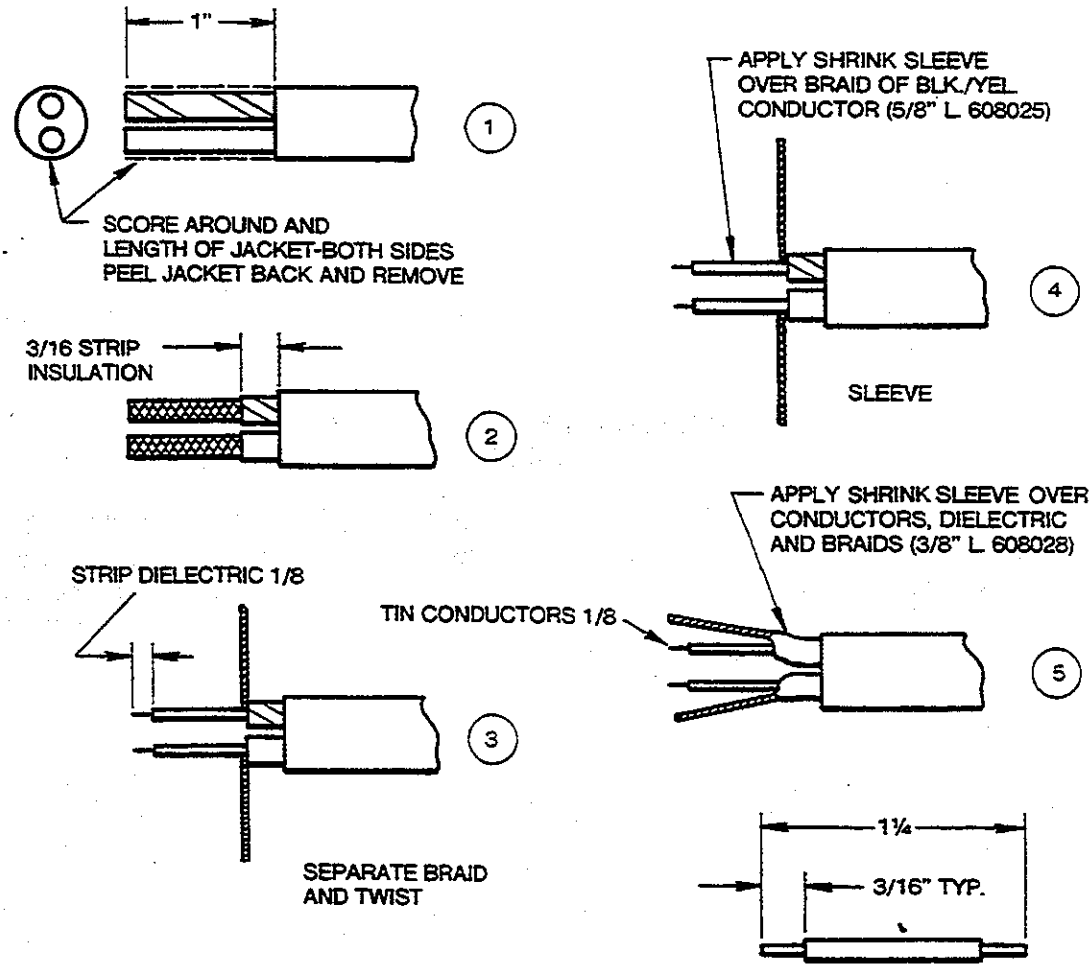
9. Install plastic ring on front of plug. This completes standard transducer plug replacement procedures.

8.3 US TRANSDUCER PLUG REPLACEMENT

1. Obtain a US replacement plug kit, Corometrics Part No. 6158G.
2. Review Section 8.2 and perform steps 1 through 4.

CAUTION: In the following steps, when soldering to braids and cable ends, avoid excessive heat since the polyethylene insulation melts very easily.

3. Prepare cable and jumper wire as depicted in FIGURE 8-2.



ULTRASOUND CABLE PLUG REPLACEMENT
FIGURE 8-2

4. Refer to TABLE 8-2 for pin connections.
5. Solder the shield braid of wire to the US Receive Shield pin (long pin).
6. Solder one end of the green jumper wire to the US Enable pin. Solder the other end of the jumper to the US Enable Ground pin.
7. Solder remaining wires to their respective short pins.
8. Complete assembly of plug as outlined in Section 8.2, steps 5 through 9.

PIN #	PIN LENGTH	I.D.	WIRE COLOR
1	short	US Xmit	*
2	short	US Xmit Shield	* (shield)
3	short	Overall Shield	bare
4	LONG	US Receive Shield	* (shield)
5	short	US Receive	*
6	short		No Connection (N.C.)
7	short		N.C.
8	short		N.C.
9	short		N.C.
10	short		N.C.
11	short	US Enable	#26 GRN jumper
12	short	US Enable Ground	#26 GRN jumper

ULTRASOUND PLUG (OCHRE) — PIN CONNECTIONS
TABLE 8-2

* These wire colors may vary. To determine proper connections, DO NOT DISCARD DEFECTIVE PLUG. Using old plug as a guide, record existing wire colors at pins 1, 2, 4, and 5. If the old plug is unavailable for reference, examine the transducer end. To access the transducer's wiring, remove the cap, the top cover, and then the protective metal shield. Care must be taken to distinguish between the transmit and receive wires. This is to ensure that the inner crystal sends the transmit signal and the 5 outer crystals receive the return signal.

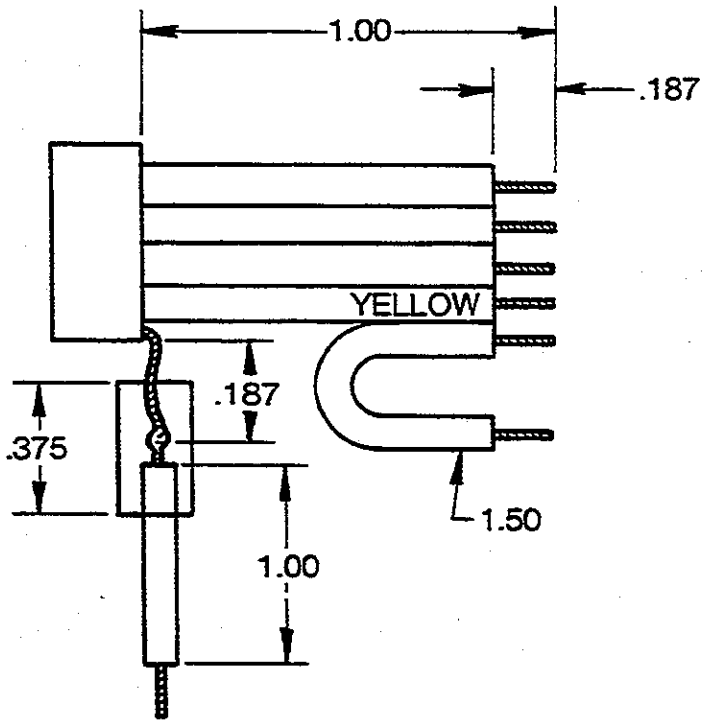
8.4 US TRANSDUCER DISASSEMBLY

A #4-40 screw under the top cap fastens the ultrasound top cover to the base. This top cap is a small square carrying the logo "C" in the top cover's center. The cap is removed by lifting the sides, inserting a blade tip along the edges of the square, and then prying upward. The screw can now be removed, followed by the top cover.

To reassemble transducer, fasten top cover to base by inserting and tightening screw. Press cap into top so all four sides are even with cover. Then, snap cap into cover by pressing it on a flat surface (such as a table top).

8.5 TOCOTRANSDUCER PLUG REPLACEMENT

1. Obtain tocotransducer plug replacement kit, Corometrics Part No. 6158J.
2. Review Section 8.2 and perform steps 1 through 4.
3. Prepare cable, shield wires, and jumper wire as depicted in FIGURE 8-3.
4. Refer to TABLE 8-3 for pin connections.
5. Solder the Shield Ground pin (longer pin) to the shield wire.
6. Solder the yellow wire and one end of the #30 green jumper wire to the Reference/Enable pin.
7. Solder free end of green jumper to Toco Enable pin.
8. Solder remaining wires to their designated pins.
9. Complete assembly of plug as outlined in Section 8.2, steps 5 through 9.



TOCOTRANSDUCER CABLE PLUG REPLACEMENT
FIGURE 8-3

PIN #	PIN LENGTH	I.D.	WIRE COLOR
1	short	+PRESS	RED
2	short	−PRESS	WHT
3	short		No Connection (N.C.)
4	short	+4 V	BLUE
5	short		N.C.
6	short	Reference/Enable	YLW & #30 GRN jumper
7	LONG	Shield Ground	#24 GRN (shield)
8	short		N.C.
9	short		N.C.
10	short		N.C.
11	short		N.C.
12	short	Toco Enable	#30 GRN jumper

TOCOTRANSDUCER PLUG (WHITE) — PIN CONNECTIONS
TABLE 8-3

8.6 TOCOTRANSDUCER DISASSEMBLY

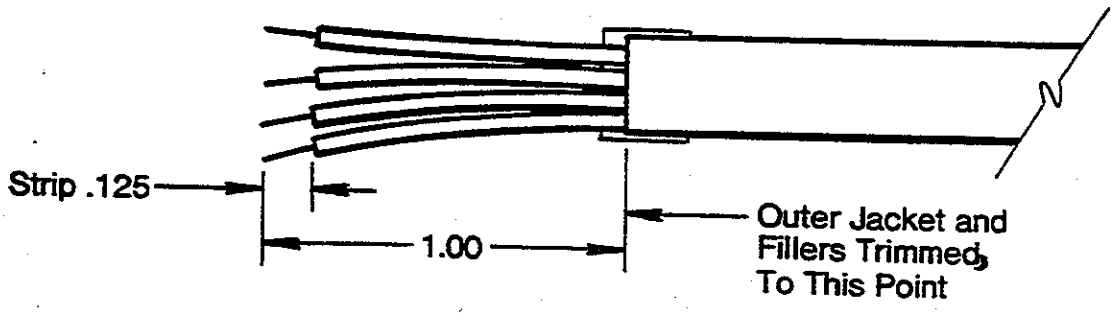
To disassemble a tocotransducer, insert a screwdriver blade into the nameplate cutout and turn gently. The cover should pop out, however, if it doesn't, try inserting blade along edge toward one of the corners and pry forward. Lip should pop out. Repeat for other corner. Once a side lifts up, repeat procedure for other side. (Do not bend cover as this may cause lips to break.)

Once the nameplate is removed, remove the four screws which fasten together top cover and base.

Note: It is not necessary to remove top cover for calibration purposes since adjustments can be made through holes in the cover.

8.7 LEG-PLATE PLUG REPLACEMENT

1. Obtain leg-plate plug replacement kit, Corometrics Part No. 6158F.
2. Review Section 8.2 and perform steps 1 through 4.
3. Strip back insulation and prepare cable wires, shield wires, and jumper wire as depicted in FIGURE 8-4.



LEG-PLATE CABLE PLUG REPLACEMENT
FIGURE 8-4

CAUTION: Read the following precautions before proceeding:

- Slide shrink tubing on cable after completing step 2, above.
- After stripping back outer jacket and braid, take notice of black covering. This is a conductive layer which must be stripped back to outer jacket.
- Identify each cable as it is stripped since colors will be difficult to determine once the sleeving contracts.
- Avoid excessive heat when tinning ends and soldering braids since the polyethylene inner insulation melts easily.

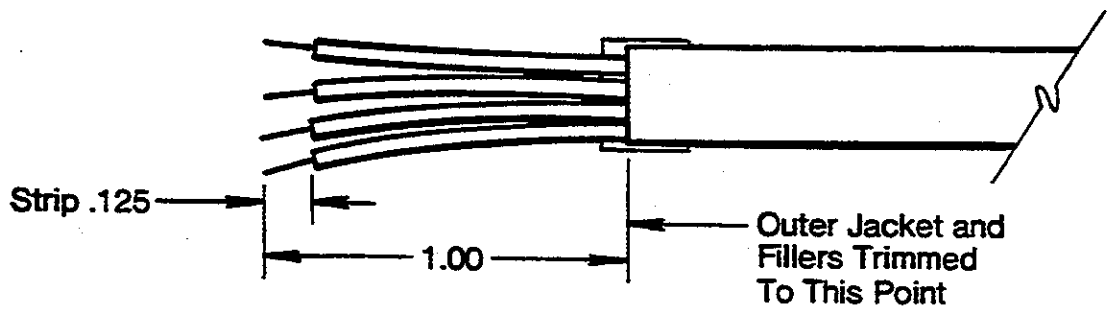
4. Refer to TABLE 8-4 for pin connections.
5. Solder Ground pin (longer pin) to blue jumper wire.
6. Solder other end of blue jumper to ECG Enable pin.
7. Solder remaining wires to their respective pins.
8. Complete assembly of plug as outlined in Section 8.2, steps 5 through 9.

PIN #	PIN LENGTH	I.D.	WIRE COLOR
1	short		No Connection (N.C.)
2	short	ECG Enable	BLUE jumper
3	LONG	Ground	BLUE jumper
4	short		N.C.
5	short		N.C.
6	short	LA (red terminal)	WHT/BLK
7	short	RA (green terminal)	WHT
8	short	Shield	#26 GRN (shield)
9	short		N.C.
10	short		N.C.
11	short		N.C.
12	short	RL (plate)	WHT/RED

LEG-PLATE PLUG (GREY) — PIN CONNECTIONS
TABLE 8-4

8.8 MECG CABLE PLUG REPLACEMENT

1. Obtain MECG plug replacement kit, Corometrics Part No. 6158F.
2. Review Section 8.2 and perform steps 1 through 4.
3. Strip back insulation and prepare cable wires, shield wires, and jumper wire as shown in FIGURE 8-5.



MECG CABLE PLUG REPLACEMENT
FIGURE 8-5

CAUTION: Read the following precautions before proceeding:

- Slide shrink tubing on cable after completing step 2, above.
- Identify each cable as it is stripped since colors will be difficult to determine once the sleeving contracts.
- Avoid excess heat when tinning ends and soldering braids since the polyethylene inner insulation melts very easily.

4. Refer to TABLE 8-5 for pin connections.
5. Solder Ground pin (longer pin) to the blue jumper wire.
6. Solder other end of blue jumper to MECG Enable pin.

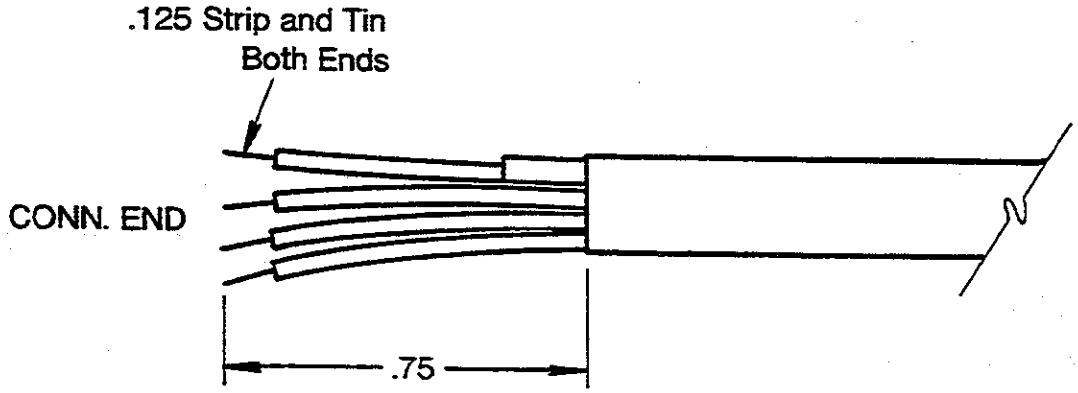
7. Solder remaining wires to their respective shorter pins.
8. Complete assembly of plug as outlined in Section 8.2, steps 5 through 9.

PIN #	PIN LENGTH	I.D.	WIRE COLOR
1	short		No Connection (N.C.)
2	short		N.C.
3	LONG	Ground	BLUE jumper
4	short	MECG Enable	BLUE jumper
5	short		N.C.
6	short	LA (black terminal)	BRN
7	short	RA (white terminal)	WHT
8	short	Shield	#26 GRN
9	short		N.C.
10	short		N.C.
11	short		N.C.
12	short	RL (green terminal)	RED

MECG PLUG (GREY) — PIN CONNECTIONS
TABLE 8-5

8.9 PHONOTRANSDUCER PLUG REPLACEMENT

1. Obtain a phonotransducer plug replacement kit, Corometrics Part No. 6158H.
2. Review Section 8.2 and perform steps 1 through 4.
3. Prepare cable wires, shield wire, and jumper wire as depicted in FIGURE 8-6.
4. Refer to TABLE 8-6 for pin connections.
5. Solder Chassis Ground pin (longer pin) to the #26 green shield wire.
6. Solder white wire and one end of green jumper wire to the Reference pin. Solder other end of green jumper wire to the Phono Enable pin.
7. Solder remaining wires to their designated pins.
8. Complete assembly of plug as outlined in Section 8.2, steps 5 through 9.



PHONOTRANSDUCER CABLE PLUG REPLACEMENT
FIGURE 8-6

PIN #	PIN LENGTH	I.D.	WIRE COLOR
1	short		No Connection (N.C.)
2	short		N.C.
3	LONG	Chassis Ground	#26 GRN (shield)
4	short		N.C.
5	short		N.C.
6	short	Phono Input	BLK
7	short	Phono Power	RED
8	short		N.C.
9	short	Phono Enable	GRN jumper
10	short		N.C.
11	short		N.C.
12	short	Reference	WHT & GRN jumper

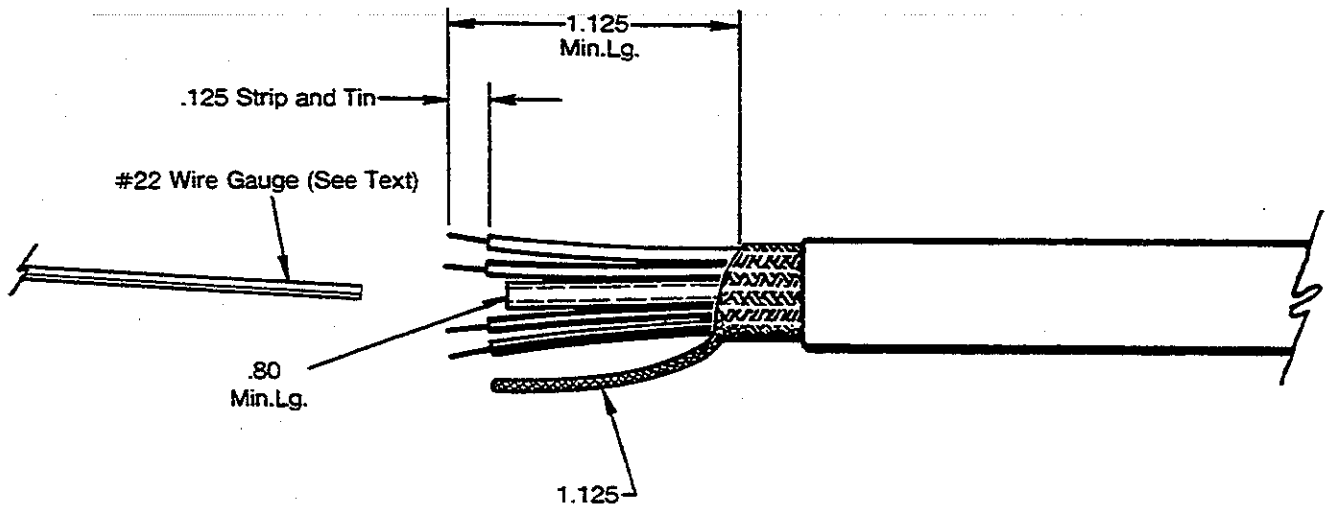
PHONOTRANSDUCER PLUG (OCHRE) — PIN CONNECTIONS
TABLE 8-6

8.10 STRAIN-GAUGE PLUG REPLACEMENT

NOTE: The strain-gauge is open to atmospheric pressure via a vented tube in the plug end of the cable. Consequently, when a plug is installed, the patency of the tube must be insured.

(At the time of manufacture, the strain relief is crimped in a special fixture that prevents the tube from being constricted. When half-shells are assembled, hot-melt glue is injected into each of the two potting holes of the strain relief recess so the recess is filled but does not enter the rest of the connector where the vent tube end is located.)

1. Obtain a strain-gauge plug replacement kit, Corometrics Part No. 6158K.
2. Review Section 8.2 and perform steps 1 through 4.
3. Prepare cable as illustrated in FIGURE 8-7.



STRAIN-GAUGE PLUG REPLACEMENT
FIGURE 8-7